

ABSTRACT

A photonic crystal waveguide and a homogeneous medium waveguide for enabling a steep bend and arrangement at an arbitrary angle with low propagation loss.

- 5 A photonic crystal waveguide (200) has a core formed by a photonic crystal (50) having periodicity in the Y-direction. Electromagnetic wave is propagated by a band on the Brillouin zone boundary of the photonic band structure of the core. A side face of the core parallel to the Y-direction is in contact with a homogeneous medium having a refractive index of n_s , and the condition of $\lambda_0/n_s > a\lambda/(\lambda^2/4+a^2)^{0.5}$ is
- 10 satisfied when the wavelength in vacuum of the electromagnetic wave is represented by λ_0 , the period of the photonic crystal is represented by a , and the period in the XZ-plane direction of the wave propagated through the core is represented by λ . This condition is a minimum requirement for preventing leakage of light from the side face of the photonic crystal waveguide 200. By satisfying this condition, the wave
- 15 propagated through the core can be confined by the side face when the propagation angle ϕ is zero degrees.